PC1S3063NTZF

Phototriac Coupler

■ Features

1. Excellent for triggering medium and high-power triac devices
2. 5 kV Isolation
3. Operating Temperature: -30 to +100°C

■ Description

1. Includes an infrared emitting diode (IRED) optically coupled to an output Phototriac
2. Features full wave control and is ideal isolated drivers for medium to high current Triacs
3. DIP package provides 5 kV isolation from input to output with superior commutative noise immunity

■ Agency Approvals/Compliance

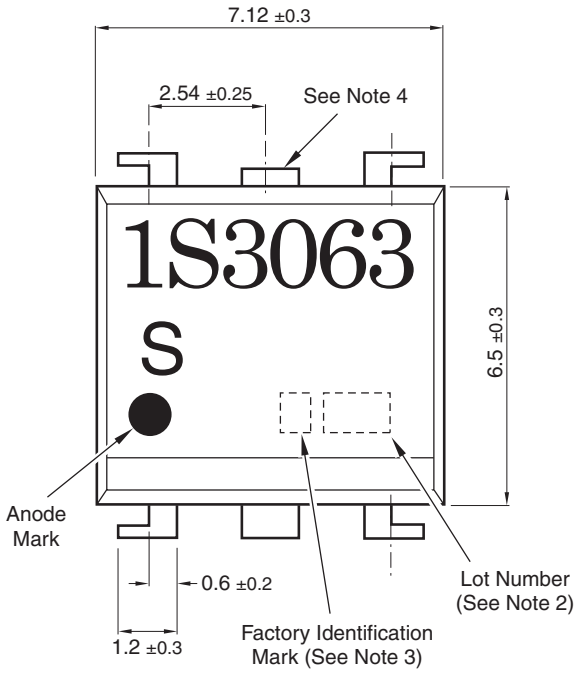
1. RoHS compliant
2. UL file E64380

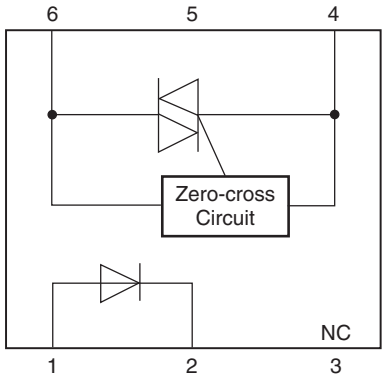
■ Applications

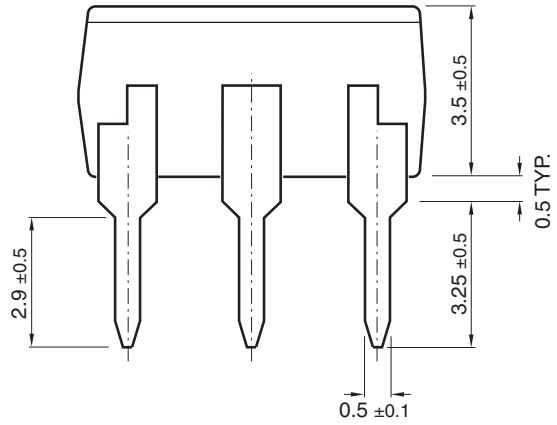
1. Triggering for Triacs used to switch on and off devices which require AC Loads; for example, heaters, fans, motors, solenoids, and valves
2. Triggering for Triacs used for implementing phase control in applications such as lighting control and temperature control (HVAC).
3. AC line control in power supply applications

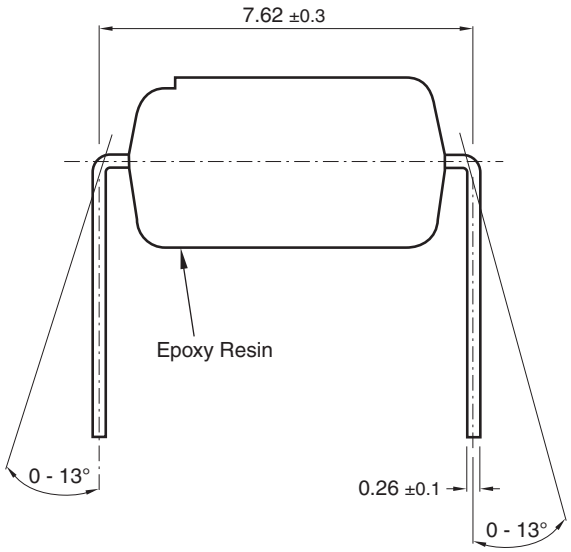
Sheet No.: ED-05P064
Date November, 2008

■ External Dimensions









NOTES:

1. Dimensions do not include resin burrs.
2. 2-digit number shall be marked according to old DIN standard.
3. Factory identification mark:
   No mark: SUN-S Corporation (Japan)
   ◹: SUN-S Electronic Technology (KUNSHAN) Co. Ltd (China).
4. Do not connect pin 5; allow to float.
   Pin 5 is cut at outside of package.
5. Pin material: Copper Alloy.
   Pin finish: SnCu plating (Cu: 2% TYP.).

PC1S3063NTZF-1

■ Absolute Maximum Ratings

(Ta = 25°C)

Parameter	Symbol	Rating	Unit
Input forward current *1	I_F	50	mA
Input reverse voltage	V_R	6	V
Output RMS ON-state current *1	I_T (RMS)	0.1	A
Output Peak one-cycle surge current *2	I_{SURGE}	1.2	A
Output Repetitive peak OFF-state voltage	V_{DRM}	600	V
Isolation voltage *3	V_{ISO} (RMS)	5	kV
Operating Temperature	Topr	-30 to +100	°C
Storage temperature	Tstg	-55 to +125	°C
Soldering temperature	Tsol	270	°C

*1 Derating factors for absolute maximum ratings vs. ambient temperature are shown in the Derating Curves.
*2 50 Hz sine wave.
*3 60 Hz AC sine-wave voltage applied for 1 minute; relative humidity 40 to 60%. Pins 1 and 3 (primary side) are shorted, and pins 4 and 6 (secondary side) are shorted for this test.
Sharp recommends measuring isolation voltage in insulating oil.

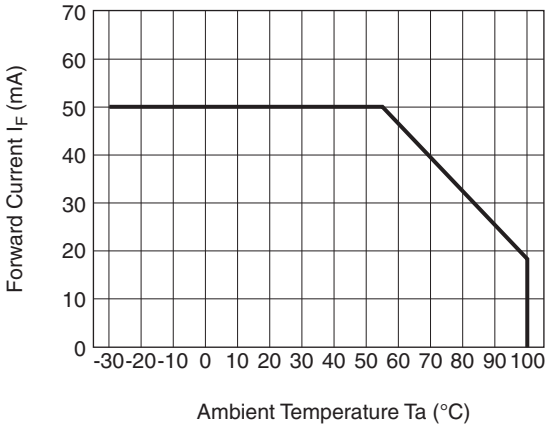
■ Electrical Characteristics

(Ta = 25°C)

Parameter	Symbol	Conditions	MIN.	TYP.	MAX.	Unit
Input Forward voltage	V_F	I_F = 20 mA	–	1.2	1.4	V
Input Reverse current	I_R	V_R = 3 V	–	–	10^{-5}	A
Output Repetitive peak OFF-state current	I_{DRM}	$V_D = V_{DRM}$	–	–	10^{-6}	A
Output ON-state voltage	V_T	I_T = 0.1 A	–	–	2.5	V
Output Holding current	I_H	V_D = 4 V	0.1	–	3.5	mA
Output OFF-state voltage critical risetime	dv/dt	$V_D = 1/\sqrt{2} \times V_{DRM}$	1000	2000	–	V/µs
Output Zero-cross voltage	V_{OX}	I_F = 8 mA, resistive load	–	–	20	V
Minimum trigger current	V_F	V_D = 4 V, R_L = 100 Ω	–	–	5	mA
Isolation Resistance	I_R	500 VDC, R_H = 40 to 60%	5×10^{10}	10^{11}	–	Ω
Turn-on time	I_{DRM}	V_D = 4 V, R_L = 100 Ω, I_F = 20 mA	–	–	50	µs

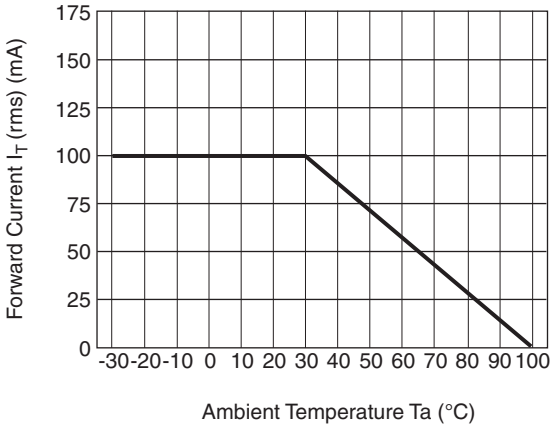
■ Derating Curves

Fig. 1 Forward Current vs. Ambient Temperature



PC1S3063NTZF-2

Fig. 2 RMS ON-state Current vs. Ambient Temperature



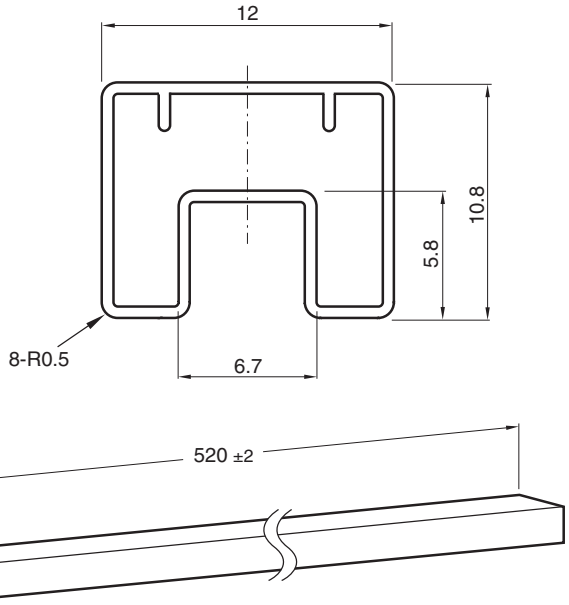
PC1S3063NTZF-3

■ Packing Specifications

Table 1. Packing Materials

Object	Material
Sleeve	HIPS with antistatic coating
Stopper	Elastomeric Styrene
Case	Corrugated cardboard
Kraft tape	Paper
Label	Paper

Fig. 3 Sleeve Shape and Dimensions



NOTES:
1. Units: mm
2. Thickness: 0.5 ±0.2 mm
3. Antistatic treatment applied to sleeves
4. Unspecified tolerance: ±0.5 mm,
   (Does not include rubber stopper)

PC1S306NTZF-5

● Packing Method

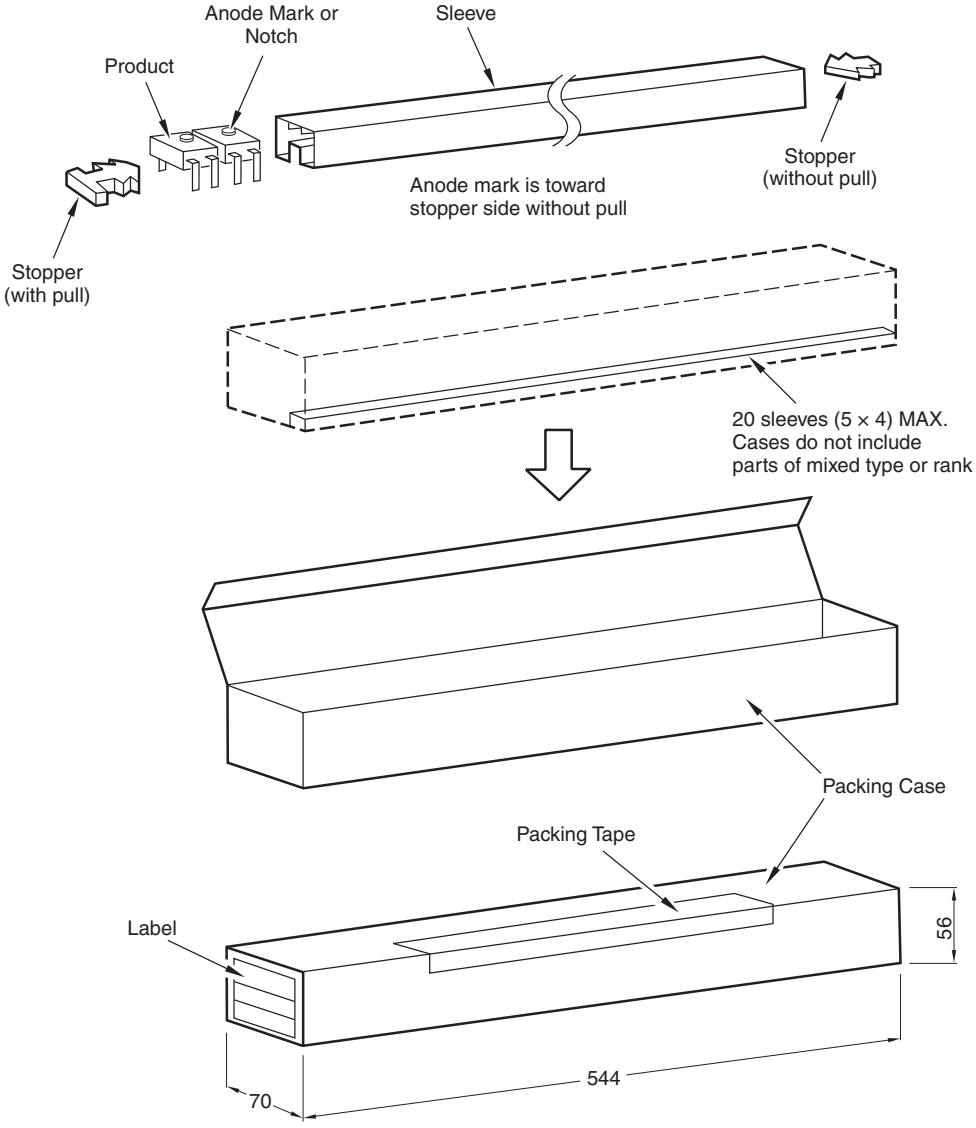
50 pcs (MAX.) of product are inserted in the sleeve, and secured with stoppers. Product mass is approximately 35 grams.

20 pcs (MAX.) sleeves are inserted in the packing case with cushioning material.

The label is added to the case.

The case is closed and sealed with kraft tape. Packed cases mass approximately 760 grams.

Fig. 4 Shipping Case Specifications



NOTES:
1. Units: mm
2. Mass: 760 g (approx.)

PC1S306NTZF-6

■ Design Notes

1. This product is not designed to resist electromagnetic and ionized-particle radiation.
2. This product incorporates a non-coherent light emitting diode. This LED will decrease in output power during the life-cycle of this device. In cases of long periods of operation, make sure that If is more that 2× the maximum value of the minimum triggering current for the circuit design. Consider the output decrease of the LED: 50% after 5 years of continuous operation.
3. For maximum part lifetime, set If so that the OFF-state current flow is 0.1 mA or less.
4. When driving an inductive (motor) load with this part, confirm this part's operation in actual use and that the zero-cross circuit operates correctly and the load does not turn on due to the phase difference in the motor's load current.
5. If voltages exceeding the repetitive peak OFF-state voltage (Vdrm) in the Absolute Maximum Ratings is applied to this phototriac, reliability may be affected and possibly breakdown. Assure that any surge voltage exceeding Vdrm is not applied; through the use of a varistor.

■ Manufacturing Guidelines

● Cleaning Instructions

1. Solvent temperature should be held under 45°C and immersion time held to 3 minutes or less.
2. When cleaning ultrasonically, Sharp recommends verifying the cleaning conditions in the production environment.
   - Acceptable solvents: Ethyl Alcohol, Methyl Alcohol, or Isopropyl Alcohol. Other solvents may erode the packaging resin. Use other solvents only after confirming them in actual use.
   - The final effect upon the part will depend on the size of the ultrasonic bath, the ultrasonic output, duration, PCB size, and the device's mounting.

● Soldering Instructions

1. When flow-soldering this part, Sharp recommends the soldering be carried out at 270°C or less and within 10 seconds. Preheat at 100 to 150°C, between 30 and 80 seconds. Solder no more than twice.
2. When hand-soldering this part, do not exceed 400°C and 3 seconds; and no more than twice.

● Presence of ODCs

This product shall not contain the following materials, and they are not used in the production process for this product:

- Regulated substances: CFCs, Halon, Carbon tetrachloride, 1.1.1-Trichloroethane (Methylchloroform). Specific brominated flame retardants such as the PBBOs and PBBs are not used in this product at all.

This product shall not contain the following materials banned in the RoHS Directive (2002/95/EC).

- Lead, Mercury, Cadmium, Hexavalent chromium, Polybrominated biphenyls (PBB), Polybrominated diphenyl ethers (PBDE).

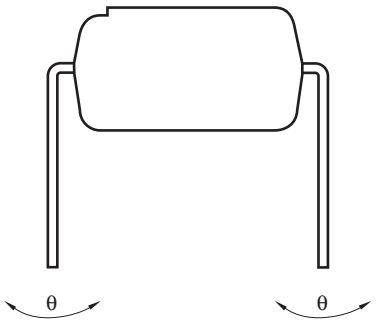
■ Reliability and Quality Information

Sharp tests to a Reliability Confidence Level of 90%. These tables illustrate the test criteria and conditions, along with the Number of Samples, the Number of Defectives, and the Lot Tolerance Percent Defective.

Test items	Test Conditions	Samples (n)	Defective (C)	LTPD (%)
Temperature cycle	-55°C (30 min) to +125°C (30 min), 20 cycles, no load	22	0	10
High temp and high humidity storage	Tstg = +85°C, RH = 85%, t = 500 hr	22	0	10
High temperature storage	Tstg = +125°C, t = 1000 hr	22	0	10
Low temperature storage	Tstg = -55°C, t = 1000 hr	22	0	10
Operating test	Ta = +25°C, I_F = 50 mA, I_T= 100 mA, t = 1000 hr	22	0	10
Mechanical shock	15 km/s^2, 0.5 ms ±X • ±Y • ±Z direction, 3 times	11	0	20
Variable frequency vibration	200 m/s^2, 100 to 2000 to 100 Hz / sweep for 4 min. X • Y • Z direction, 4 times	11	0	20
Terminal strength	Tension: Weight = 5.0 N, 5 times per terminal Bending: Weight = 2.5 N, 2 times per terminal	11	0	20
Solderability	245°C ±3°, 5 s	11	0	20
Soldering heat	Flow soldering: 270°C, 10 s Hand soldering: 400°C, 3 s	11	0	20

NOTES:
1. V_F, V_T: > U × 1.2; I_{FT} > U × 1.3; I_R, I_{DRM}: > U × 2.0; where U = Upper Specification Limit. All tests conform to EIAJ ED 4701.
2. Solder must adhere in 95% of soldered area, no pinholes or concentrated holes in any area. Dip soldering is held back 1.0 mm from resin.
3. See Fig. 5 for Terminal bending directions.

Fig. 5 Terminal Bending Test



PC1S3063NTZF-4

● Quality Level

Sharp utilizes the IS02859-1 standard when measuring product quality. The method is a single sampling plan, following normal inspection level S-4. This table lists the Defect Judgment Criteria and Defect Classifications.

Test items	Defect Judgment	Defect	AQL
Electrical Characteristics	Does not fully conform to specification values for V_F, I_R, I_{DRM}, V_T, I_FT, R_{ISO}, V_{ISO}	Major defect	.065%
Appearance	Unreadable marking		
Appearance	Any defect except as above	Minor defect	0.25%

■ Important Notices

· The circuit application examples in this publication are provided to explain representative applications of SHARP devices and are not intended to guarantee any circuit design or license any intellectual property rights. SHARP takes no responsibility for any problems related to any intellectual property right of a third party resulting from the use of SHARP's devices.

· Contact SHARP in order to obtain the latest device specification sheets before using any SHARP device. SHARP reserves the right to make changes in the specifications, characteristics, data materials, structure, and other contents described herein at any time without notice in order to improve design or reliability. Manufacturing locations are also subject to change without notice.

· Observe the following points when using any devices in this publication. SHARP takes no responsibility for damage caused by improper use of the devices which does not meet the conditions and absolute maximum ratings to be used specified in the relevant specification sheet nor meet the following conditions:
(i) The devices in this publication are designed for use in general electronic equipment designs such as:
--- Personal computers
--- Office automation equipment
--- Telecommunication equipment (terminal)
--- Test and measurement equipment
--- Industrial control
--- Audio visual equipment
--- Consumer electronics

(ii) Measures such as fail-safe function and redundant design should be taken to ensure reliability and safety when SHARP devices are used for or in connection with equipment that requires higher reliabilty such as:
--- Transportation control and safety equipment (i.e., aircraft, trains, automobiles, etc.)
--- Traffic signals
--- Gas leakage sensor breakers
--- Alarm equipment
--- Various safety devices, etc.

(iii) SHARP devices shall not be used for or in connection with equipment that requires an extremely high level of reliability and safety such as:
--- Space applications
--- Telecommunication equipment (trunk lines)
--- Nuclear power control equipment
--- Medical and other life support equipment (e.g. scuba)

· If the SHARP devices listed in this publication fall within the scope of strategic products described in the Foreign Exchange and Foreign Trade Law of Japan, it is necessary to obtain approval to export such SHARP devices.

· This publication is the proprietary product of SHARP and is copyrighted, with all rights reserved. Under the copyright laws, no part of this publication may be reproduced or transmitted in any form or by any means, electronic or mechanical, for any purpose, in whole or in part, without the express written permission of SHARP. Express written permission is also required before any use of this publication may be made by a third party.

· Contact and consult with a SHARP representative if there are any questions about the contents of this publication.